STRATEGY RESEARCH PROJECT

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# INFANTRY IN THE 21ST CENTURY

BY

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# Infantry in the 21st Century

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# ABSTRACT


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This paper answers the question: "What human characteristics must the Infantry soldier have in order to fight and win on the battlefield of the future?" The most important task of a peacetime army is to prepare for war. Normally, this is thought of in terms of the training and logistic readiness that occupies most of the Army. However, it also includes the more fundamental task of anticipating the character of future war in order to properly design the forces that will fight that war. The Chief of Staff, Army's recent initiative to develop a Medium Brigade is pointed toward that end. The United States Army's formal efforts to look to the future are embodied in the "Force XXI" and "Army After Next" activities. However, those efforts, as well as the Chief's initiative, focus almost exclusively on what technology, force structure, and equipment offer the best chance for future success. Little is being done to identify what war will be like for the soldier of the future and, more important, what human characteristics the soldier of the future needs to fight and win in that environment. The battlefield of the future will be a chaotic and non-linear environment. Forces will be intermingled and highly effective weapons will inflict great destruction and force wide dispersion. United States Army combat forces will be equipped with technology enabling unprecedented tempo, speed, and lethality within this environment. Likewise, there will be unprecedented demands on the soldiers charged with fighting in this environment. In particular, the Infantrymen of the future, the soldiers charged with seeking out and destroying the enemy, will be physically strained, psychologically stressed, and mentally tested to levels not normally seen in past wars. War has always demanded much of soldiers, particularly the Infantry. It will demand even more in the future. The most complex and challenging task on the battlefield of the future will belong to the Infantryman. Battlefields will have no frontlines. Weapons capabilities mean there will be no safe havens. Weapons will be fired from out of hearing and out of sight and will kill without warning. The night will no longer be a sanctuary, providing neither protection nor rest. Soldiers will be dispersed as never before; losing the comfort that comes from seeing their comrades nearby. Individual soldiers must skillfully operate suites of complex communications and weapons technology. The same soldier will have the capability and the responsibility to employ vast amounts of firepower with his individual weapon and, more often, with supporting weapons that can provide precise overmatch lethality in real time or near-real time from manned and unmanned air, space, sea, and ground systems. Battles will be fought increasingly in urbanized areas with the enemy intermixed with civilians. The paper concludes that the individual Infantry soldier of the future must be smart enough to handle complex weapons and communications technology as well as to make decisions on employment of highly lethal systems amongst intermixed enemy, friendly, and civilian elements. He must be physically strong and agile to operate effectively in urban environments and while carrying a full combat load; as well as toughened to withstand the rigors of physical exertion and little sleep for extended periods of time. He must be psychologically sound; able to continue his mission in a lonely, high stress, rapidly changing environment filled with sudden violence and difficult decisions. The current United States Army personnel model is not intended or designed to produce such a soldier. Producing the Infantryman of the future will require significant changes in how the Army recruits and retains with significant potential ramifications to pay, promotions, and rank structure.

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# INFANTRY IN THE 21ST CENTURY

> The mission of the Infantry is to close with the enemy by fire and maneuver in order to kill or capture him or to repel his assault by fire, close combat, or counter-attack.[1]

Since the collapse of the Soviet Union and the end of the Cold War, much has been written about the future of warfare. Unleashed from the immediacy of the threat posed by Warsaw Pact armies poised on the edge of Western Europe, the United States military began to look ahead. What would future warfare look like? How can we capitalize on the Revolution in Military Affairs? What is the Revolution in Military Affairs? How should we structure our military? How many aircraft carriers? How many fighters and what kind? Should the Army emphasize tanks or medium armored vehicles? How much better do we get when we digitize the battlefield? When we use Unmanned Airborne Vehicles? When we field ATACMS Block II . . . III . . . IV . . . V? How about the new Objective Infantry Combat Weapon? No matter what the question and how well grounded or speculative the answer however, the common thread is technology. Fiber optics, dancing electrons, paired photons, unblinking eyes from space, phased arrays, brilliant munitions, robotic helpers, autonomously homing projectiles, chameleon-like armor, and over-the-horizon engagement are all predicated on advancements in science and invention. The idea is that America's proven capability in high technology will produce wonder weapons that ensure victory should any adversary be so unwise as to tangle with the U.S.A.

When people are mentioned, it is normally in the context of how we will not need so many as the machines will do the job. History is replete, however, with examples of forces with the most modern weapons and equipment of their era that were defeated by ill-equipped, but innovative and aggressive adversaries. Think of the American Revolution, the Chinese in Korea, the Vietnam War, the *Mujahadeen* in Afghanistan, and the Chechens in the first battle for Grozny.

The most critical part of warfare is people. No weapon can take the place of thinking soldiers with courage and resolve. And it is the soldiers that actually have the responsibility for fighting the enemy on the ground that ultimately make the difference between victory and defeat. Those soldiers are the infantry. Infantry is known as the "Queen of Battle". The title derives from the game of chess where the Queen is the only game piece that can move in any direction and go anywhere on the board to "kill or capture" any other piece. Similarly, the Infantry is the only branch that can go anywhere on the land, in any terrain, weather, or climate and accomplish its mission to "kill or capture" the enemy. As long as people live on the land and as long as war objectives translate into the control of populations, land, or resources, the United States must put infantry soldiers on the ground to attain the ultimate victory. However, is the battlefield of the future so different from the battlefield of yesteryear and today that the infantry soldier of the future must also differ from the infantry of the past and present? The answer to that question can only be arrived at by first examining the battlefield of the future. What will it be like? What are the demands it will place on the individual combat soldier? Only then can we determine the characteristics the infantryman of the future must have in order to succeed.

## BATTLEFIELD OF THE FUTURE

Predictions are tough to make, particularly about the future.

—Yogi Berra

There are two determinants of the battlefield of the future. The first category includes those enduring qualities of all wars such as violence and danger, fog and friction--Clausewitz's "atmosphere of war". The second category includes the characteristics of war peculiar to a particular period. Technology normally drives those characteristics, but new and innovative ideas for using existing technology can also spawn a truly different method of fighting. The Roman *manipular* legion, Napoleon's system of war, and the German Army's "infiltration tactics" of World War I provided often decisive advantages against opponents who had virtually identical equipment and technology.

## ENDURING CHARACTERISTICS OF THE BATTLEFIELD

Clausewitz states that there is an "atmosphere of war" in which all battle takes place. That atmosphere is composed of danger, physical exertion, uncertainty, and friction. Those elements together cause the difference between battle as it is planned and what actually happens[2]. This concept will be used to describe the enduring characteristics of war.

### DANGER

Bravery is the capacity to perform properly even when scared half to death.

—General Omar Bradley[3]

Danger is the quality which causes "the light of reason to refract in a manner quite different from that which is normal" and prevents the mind of a man from working with "normal flexibility"[4]. It is inevitable in the conduct of war as it is a defining characteristic of war itself. War is the use of force to compel others to do our will. The danger of being violently killed or maimed is inescapable when force is used.

Reaction to danger varies by individual. Some flee in panic. Some are mentally or physically immobilized. Some become confused and disorganized to the extent that they cannot accomplish their military mission or may even endanger themselves through clearly inappropriate actions. Some simply behave as the other soldiers closest to them behave. Still others take the action required by the situation and accomplish their mission[5].

Regardless if the instrument of war is a sword, musket ball, precision guided munitions or a laser beam; danger and its influence on human behavior must be accounted for in any description of the battlefield of the future.

## PHYSICAL EXERTION

The first virtue of a soldier is endurance of fatigue.

—Napoleon[6]

Physical exertion is the effort soldiers expend on overcoming the effects of heat or cold, hunger or thirst, lack of sleep, and physical labor. There is extensive literature on the debilitating effects of physical exertion on the fighting capability of units. SLA Marshall writes of Korean War units "listless" and over-run by enemy attack because of fatigue. He also describes attacks halting due to the physical exhaustion of the soldiers[7]. Physical labor will be a part of warfare as long as combat soldiers are required to move on foot, fortify positions, and carry a fighting load.

While nanotechnology and advances in developing lightweight materials are promising reductions in the weight of individual pieces of equipment, the countervailing trend is to equip the soldier with ever more gear. The Army's "Land Warrior" project is an example. The soldier wears a helmet with embedded radio and visor with heads-up display. He carries a weapon incorporating a rifle, night sight, telescopic sight, grenade launcher and laser. He wears protective body armor with assorted straps, pouches and hooks for ammunition, water, gas mask, and first aid items. On his back he carries a rucksack with batteries, a radio, a global positioning receiver, a transponder to broadcast his location, and a small computer. Grand total (without food, tobacco, chewing gum, or a copy of Playboy) is almost 90 pounds.[8] The specifics are not as important as the idea that as long as technology continues to advance, there will be new equipment for soldiers; much of which we have not yet even imagined. The result will be foot soldiers still carrying a significant load on their bodies.

As the earth's urbanized terrain continues to increase and as larger portions of the world's population lives in cities and towns, the likelihood increases that military operations will include built-up areas. The physical structure of built-up areas imposes its own requirements on military forces. Most movement will be on foot. Infantry soldiers with agility and quickness will have an advantage in rubbled areas or in the cluttered interiors of buildings. Upper body strength will be at a premium to pull equipment-laden soldiers up through windows and holes as well as to move obstacles and debris, and carry casualties or heavy equipment. Physical labor will be part of the battlefield equation for the infantry.

During early eras, warfare was conducted in daylight. There were no sources of artificial illumination or sensors that could pierce the darkness. Armies that relied on massing soldiers to achieve combat power could not maintain the necessary close formations to operate effectively at night. As a result, except for small parties designated for security, reconnaissance, or raids, soldiers mostly slept at night and fought or moved in daylight. With the advent of long-range weapons, soldiers increasingly turned to the night for movement and routine logistic activities or to gain a tactical advantage. Because of American air and artillery dominance, both the Chinese in Korea and Vietnamese conducted the bulk of their tactical movements and attacks under the cloak of darkness. Later, incorporation of night vision

devices into units permitted complex tactical operations after dark. As a result, warfare no longer slows down at night and the time and opportunities for sleep are lessened.

A study of U.S. Infantry soldiers on the front in Italy in WWII during a relatively quiet period found that one–third averaged less than four hours of sleep per night and three-fourths less than six hours.[9] U.S. Army troops in Korea were described as sleep-deprived and "strained to the breaking point" by the pattern of American units moving and attacking in the day and then staying alert all night to repulse Chinese counterattacks.[10] Even in the relatively brief "100 Hour War" in the Persian Gulf, infantry veterans of the 101st Airborne Division's air assault to the Euphrates River valley tell of a day and night of movement and preparation for the air assault, then an early morning helicopter move, another day and night of foot movement and defensive preparations, followed by a day on alert for Iraqi counter-attacks. Soldiers and especially leaders were described as "virtually catatonic", "asleep standing up", and difficult to motivate due to lack of sleep[11].

Danger, with the fear it produces, combined with uncertainty and the weight of responsibility all produce stress on soldiers. Stress has a physical effect on the human body that includes susceptibility to illness and accelerated burning of the body's energy reserves leading to increased tiredness. [12] The same task accomplished in a stressful, combat situation requires more exertion than when accomplished in a benign environment. When combined with sleep deprivation, exhaustion quickly follows. Those who experienced the great envelopment around the west flank of the Iraqi positions in the Persian Gulf War, even when mounted in vehicles, recounted the fatigue of tank and infantry fighting vehicle drivers, gunners, and vehicle commanders forced to stay alert and ready for action while advancing for 36 straight hours.[13]

Physical exertion will remain a defining characteristic of war. The relatively short duration wars predicted by some futurists will still approximate the length of the Persian Gulf War. Even in that ideal terrain with a relatively ineffective enemy, the factors of physical exertion were at play for combat soldiers. The performance of infantry will continue to be affected by stress, a heavy soldier's load, physical labor, and continuous day/night operations for extended periods with the resultant potential for sleep deprivation and physical exhaustion.

## UNCERTAINTY

There is nothing certain about war except that one side won't win.
—Sir Ian Hamilton[14]

Uncertainty refers to information about the enemy or military intelligence. It is a great paralyzer of action for, as Clausewitz says: "Many intelligence reports in war contradictory, even more are false, and most are uncertain[15]." It is uncertainty that causes the fog of war. Many military futurists promise that new information technology will roll back the fog. They hold forth the promise of systems of sensors and platforms using digital technologies to gain real time, full time visibility of the battlefield that will lead to perfect knowledge of the enemy. The promise is based on the risky assumption that the enemy will not be capable of devising tactics or technology to spoof, jam, destroy or otherwise negate our systems.

Such measures have been taken by our adversaries in the recent past and have proven to be effective, even if not technologically sophisticated.

In Operation DESERT STORM, Iraqi ammunition supply points were hidden by the simple expedient of covering them with plywood and then sweeping sand over the top. Units from the United States Army 24th Infantry Division had to drive right in amongst them to discover them.[16] During the NATO air attacks on the Yugoslavian Army in Kosovo in 1999, Yugoslavian units painted bomb damage on roads so NATO aircraft would not attack again, built wooden mock-ups of tanks, complete with heat signatures (supplied in some cases by portable hair dryers!) and watched with glee as expensive precision guided munitions turned their creations into matchsticks.

Regardless of the technology, uncertainty will always exist when working with the human factor. No technology can tell us what scheme is in the mind of the enemy commander or how an enemy soldier will react to attack or how hard or how long the enemy will fight. Iraqi soldiers were supposed to fight with the determination and skill gained in long combat with the Iranians. Many pre-battle estimates for United States casualties ranged as high as 10,000. Instead, the Iraqis quickly folded and American casualties totaled a few hundred. President Slobodan Milosevic of Yugoslavia was expected to back down and accede to United States demands in Kosovo with the prodding of a couple days worth of limited bombing. Instead, he complied with a lesser version of the demands three months later after thousands of NATO aircraft sorties, thousands of Serbian and Kosovar casualties, billions of dollars worth of damage, and the creation of hundreds of thousands of refugees.

In April of 1940, the German fleet sailed from is ports in the Baltic on its way to land an invasion force in Denmark and Norway. The Danes spotted the fleet and decided that the Germans were going to land on the south coast of Norway and accordingly took no action. The Norwegians spotted the fleet and decided that the Germans were going to land on the coast of Jutland in Denmark and accordingly took no action. The British spotted the fleet and decided that the Germans were attempting to break out into the North Atlantic to raid shipping and accordingly sailed the Home Fleet northwest from Britain on an interception course. When the Germans abruptly turned into Copenhagen and Oslo along with various other ports on the Norwegian coast, they attained surprise and rapid success[17]. While having good information on the German fleet, neither Denmark, Norway, nor Britain could divine the intentions of the Germans. Regardless of how refined a picture of the battlefield is attained, what is in the mind of the enemy will always be hidden.

For most of the history of warfare, opposing commanders had the "real time, full time" picture of the battlefield that came with massed armies arrayed against each other in open terrain. It is unlikely that any future technology will be able to produce as good a picture of the battlefield as both Alexander and Darius had at Gaugamela or both Napoleon and Wellington had at Waterloo using their own eyes to watch the battle unfold. Yet, even in that environment, there was surprise, uncertainty, and, for Darius and Napoleon, defeat in spite of their complete picture of the battlefield. Regardless of the promise of

high technology wizardry, uncertainty will continue to be the companion of soldiers in battle. In fact, high technology will make the battlefield of the future even more uncertain in many ways.

Change came at a snail's pace for most of military history. For thousands of years, the basic weapons were bow and arrow, sword, and spear. For hundreds of years they were muskets, bayonets, and muzzle loading smooth bore artillery. For both epochs, movement was by foot, horse, or over water by rowing or power of the wind. Soldiers could rely on technological constants throughout their careers. In the past two hundred years, the speed of change has picked up and is now accelerating to an unprecedented pace. It is highly likely that future soldiers will meet weapons on the battlefield that they did not anticipate or train to counter.

## FRICTION

> . . . for want of a nail, the shoe was lost; for want of a shoe the horse was lost; and for want of a horse the rider was lost.
>
> —Benjamin Franklin[18]

Friction is the "force that makes the apparently easy so difficult"[19]. It comprises all those unforeseen circumstances that ruin plans and frustrate action. Friction was what enabled spear carrying Zulu warriors to massacre 1100 British soldiers armed with modern rifles at Isandlwhana, South Africa in 1876. Quartermasters were unable to open enough of the securely fastened crates of reserve ammunition fast enough to replenish the firing line as it ran out of bullets. Then, in the smoke and confusion, when soldiers reported to the wrong supply points for ammunition, many of them were refused what cartridges were available because they were assigned to different units. When the volume of fire died down and the Zulus closed in, the British bayonets were no match for the *assegai* thrusting spears wielded by hardened warriors.[20]

Every individual and piece of equipment retains its own quotient of friction, and the least important of all can maximize its friction potential at exactly the right moment to make things go wrong. Friction cannot be predicted or eliminated because it is based on chance. Just like a machine, the more moving parts in an organization and the more complex the structure, the more points of friction and the higher likelihood of malfunctions and breakdowns. And, if nothing else, the military of the future will be highly complex. That complexity, combined with danger and physical exertion, makes a great catalyst for friction.

## CONTROL THE FOG

Military establishments have taken two seemingly contradictory approaches to achieve success within the peculiar environment of war. The French Army in World War II exemplifies the first approach. The French concept was to eliminate fog, friction, and uncertainty by fighting a tightly controlled, methodical battle. They believed that centralized planning and control of execution along with strict adherence to procedural guidelines would eliminate both uncertainty and the likelihood of some "loose cannon" maximizing his friction potential. However, in the 1940 Battle of France when the Germans

sliced behind the French units severing command and control, they "crumbled into helpless fragments[21]" incapable of generating the combat power necessary to stop the Germans.

OR EXPLOIT THE CHAOS

The second approach is to recognize that fog, friction, and resultant disorder and chaos are inevitable, normal, and even insofar as they affect the enemy, desirable. The German infiltration tactics used so successfully in the last year of World War I were a direct result of this approach. Small "storm trooper" detachments were formed with specially selected and trained soldiers. Each detachment was organized with riflemen, machineguns, grenadiers, flamethrowers, demolitions, and mortars. The storm trooper commanders were given *minimum* attack objectives and were told to cooperate with, but not to depend on or wait for, units on their flanks. The commanders were given considerable latitude and expected to use it. Even individual soldiers were briefed as to objectives and the necessity of taking whatever individual action was necessary without orders. Combining arms at small unit levels was designed to make units tactically self-sufficient. They therefore did not have to stop and fight the inevitable friction involved in sending for and bringing forward special personnel, weapons, and ammunition[22]. All these measures are designed to enable small unit leaders to quickly generate combat power in the danger, fog, and friction of war.

The atmosphere of war is always present in battle. Confusion and chaos are therefore inevitable. Centralization of resources and decision authority, as the French did, will not eliminate the atmosphere of war, but will reduce the capability of subordinate units to cope with it. Thus the collapse of French units when cut off or isolated from their headquarters. Generation of combat power within confusion and chaos requires mission type orders and wide latitude for the leader on the spot to make decisions on how to accomplish the mission. Incumbent with decentralized decision authority is the decentralization of resources to enable the decision to be carried out. This calls for units organized in the combined arms manner of the German storm trooper detachments. Units must be tactically self contained and capable of independent action. This became more important with the phenomenon of reduced unit density on the battlefield.

The enduring characteristics of war are time and technology independent. The elements of fog and friction, physical exertion, danger and uncertainty were present in both ancient and modern warfare and will continue into the future. While these factors are always present in war, there are other elements that vary in their influence, making battle in every era different and unique.

**EMPTY BATTLEFIELD.**

There's no such thing as a crowded battlefield. Battlefields are lonely places.

—GENERAL ALFRED M. GRAY[23]

In antiquity and on up through the Napoleonic era of warfare, armies were normally deployed in densely packed masses designed to maximize the cumulative combat power of individual soldiers carrying short range weapons. However, beginning in the American Civil War and the Franco-Prussian

War of 1870, observers began to remark on the increasing dispersion of troops on the battlefield. The term for this phenomenon is the "empty battlefield". [24] Understanding the factors contributing to the empty battlefield is key to understanding future warfare, as there is every indication that the trends dictating increased dispersion will continue.

The empty battlefield is primarily based on technology and the tactics derived from increases in weapons capability. Technology driven increases in weapons lethality contributed to the empty battlefield by increasing the amount of firepower that could be generated by individual soldiers and by causing soldiers to decrease their vulnerability to this greater lethality. Increasing the amount of firepower generated per soldier enabled armies to place fewer soldiers in the front line while maintaining or even increasing coverage of a given area with fire. The phenomenon is a function of the increased range, accuracy, rate of fire, and casualty creating effects of weapons.

## RANGE INCREASES TO THEATER OF OPERATIONS

Increases in weapons ranges started slowly, but have accelerated rapidly in recent years. It was thousands of years before swords, spears, and arrows were replaced by muskets with a range of 100 yards. Rifles became the common weapon a few hundred years later and could fire effectively for several hundred yards. In the last one hundred years, battlefield depth has increased from the thousand yards that direct fire artillery and rifle fire could reach to the one hundred kilometers that a modern formation can dominate with sensors, long range artillery, rockets, missiles, and attack helicopters or fighter-bomber attack. The effect has been to increase the depth of the tactical battlefield as weapons ranges increase.

Range is a function of technology. As advancement and innovation in technology are ongoing, then range increases will continue for both direct and indirect fire weapons. On the other hand, theaters of operations and theaters of war are based on political and geographic considerations and are normally fixed for a particular conflict. A ramification is that the depth of the tactical battlefield will soon expand to include the entire depth of the theater.

## TACTICAL ENGAGEMENT FROM OUTSIDE THE THEATER OF WAR

A further ramification is that weapons employed for tactical effect in a theater will have ranges that enable them to be launched from far outside the theater; to include from space, bases in the United States, on and under the sea, and from aircraft. A hint of this comes from both the 1990 Persian Gulf War and the 1999 attack of Yugoslavia in which bombers from bases in the United States and cruise missiles launched from submarines and surface ships hit targets in Iraq and Serbia. The label "strategic" is often attached to such attacks, based on the unfortunate current lexicon which equates long range, cross border attack or the use of something large that flies through the air with strategic attack. However the actual targets were most often tactical in nature: enemy aircraft in revetments or hangars, ground force barracks and assembly areas, air defense sites, and command posts.

A cruise missile is more expensive than an artillery shell. However, a cruise missile offers pinpoint accuracy and it takes a lot of artillery shells to achieve the same effect. Of course, a Copperhead laser guided artillery projectile offers the same accuracy. But now the cost is closer. Add in

the cost of the artillery piece firing the Copperhead, the ship to move it into theater, the laser designator to "illuminate" the target, the support structure to fuel, fix, man, sustain, and secure the artillery and the costs get turned around. As super long-range munitions become more cost-effective and proliferate in the American arsenal, whether they are cruise or ballistic missiles, space fired lasers, or other attack means not yet thought of, they will be used in more and more situations. The trend is toward attacking any type of target, large or small, using any available weapon with the necessary range from anywhere in the world.

## ONE SHOT, ONE KILL

Concurrent with increases in range has come increases in the ability to accurately hit targets. In World War II an average of 18 rounds was needed to kill a tank at a range of 800 yards. During the 1973 Arab-Israeli War, the average was two rounds at 1,200 yards, and in Desert Storms one round at 2,400 yards.[25] Technology such as thermal imaging enables weapon to accurately aim at night and in all types of weather. Laser aiming devices that place an illuminated "spot" on their target are attached to rifles and enable first round hits as the soldier simply pulls the trigger when the laser dot is on the target. Computerized fire direction procedures combined with sophisticated navigation systems enable artillery to fire effectively without adjustment. Autonomously homing and laser guided munitions provide pinpoint accuracy. Satellite based navigation gives weapons based from the other side of the world the capability to hit a point target. Past practice has been to mass fires to kill a target. The movement is toward weapons systems capable of achieving a high probability of hitting the target each time they are fired.

An organizational ramification is that Army artillery units will no longer need to mass howitzers on the battlefield and maintain centralized control over their firing. Modern artillery is still handled in much the same way as musket-equipped infantry companies of 200 years ago—emplaced as a unit, all weapons pointed at the same target, firing on command in platoon volleys, hoping that enough rounds shot in the direction of the enemy will result in at least some of them striking the target. That philosophy is how the U.S. Army VII Corps in the Gulf War expended 55,000 artillery rounds and 10,500 Multiple Launch Rocket System (MLRS) rockets in a 100-hour war[26]. Much as the infantry has pushed decision making and fire control further down the chain of command in order to gain responsiveness and rapid action with resultant lethality, the artillery will begin doing the same as technology equips individual howitzers with longer range, mobility, exact positioning data, navigation, precision munitions, on-board fire computational equipment, and communications gear enabling a real time picture of the battlefield and instant contact with any friendly unit in range of the weapon.

## CLOSE-IN FIRES

A secondary, but increasingly important effect of this trend is that increased accuracy also enables the employment of weapons in much closer proximity to friendly troops or local civilians. "Danger Close" for United States Army artillery—when special care is called for because of the short distance between friendly forces and the planned impact point of the artillery, ranges from 400 to 600 meters depending on the type of artillery. Yet the casualty producing bursting radius of the artillery rounds

ranges from only 35 to 100 meters. The rest of the "danger close" distance, 80-90%, is based on the inaccuracy of the artillery. Similar planning factors are included for direct fire weapons and air delivered munitions. As more and more weapons systems gain built-in point accuracy, the stand-off distance for troops on the ground will grow closer and closer to simply the casualty producing radius of the round.

A further consequence of increased accuracy is a decrease in the requirement for weapons with large-scale blast effect to destroy the target. Based on the inherent inaccuracy of weapons plus the difficulty of precisely identifying and acquiring targets, past solutions have tended toward large amounts of large explosive devices delivered to the general area of an enemy in the hopes that at least one of the explosions will be close enough to achieve the desired effect. Obviously, the bigger the explosion, the more likely something will be damaged or destroyed. The World War I artillery barrage that lasted for days and delivered tons of ammunition per kilometer of enemy trench-line is one manifestation of this idea. (As shown by the 1999-2000 Russian campaign against the Chechens in Grozny, this tactic is still in use.) Another was the World War II idea of using multiple formations of large bombers dropping patterns of 500-pound bombs to destroy German factories or transportation infrastructure. When either system was used close to friendly troops or civilians, fratricide or so called "collateral damage" often occurred. The pre D-Day air and naval bombardment is thought to have killed as many as 10,000 French civilians. Fort McNair in Washington, DC is named for General Leslie McNair, who was killed along with several hundred other American troops by bombs dropped by friendly aircraft operating at high altitude in an attempt to blast through German front-line defenses in Operation COBRA, the Allied breakout from the Normandy beachhead.[27]

The current developments are toward limited blast effect, based on high accuracy, and a consequently lower casualty-producing radius. In United States attacks on Iraqi air defense and communication sites in 1999, weapons accuracy was so high that the bombs were filled with concrete, creating their damage by the kinetic energy distributed upon impact. With no high explosive blast effect, the bombs could be used in close proximity to civilian locations with less likelihood of collateral damage. Similarly, kinetic energy, beam type weapons, and to a lesser extent, shaped charge warheads, can be used in very close proximity to friendly troops.

In the summer of 1993 when United Nations troops in Somalia suffered casualties in an attack by a Somali militia faction, they launched a retaliatory attack into a militia enclave in the city of Mogadishu. Militia resistance from heavily constructed buildings pinned down Moroccan troops at close range. A United States Army liaison element called in Cobra helicopters to assist. Standing off over 1200 meters from the fighting and with friendly forces approximately 70 meters away from the target, the Cobras fired wire-guided TOW missiles directly into the windows of the buildings occupied by the militia. This example of remotely delivered, highly accurate and lethal fires, directed by a ground element in close proximity to the enemy illustrates the concept. A tertiary effect of close in engagement with remote based weapons is to counteract the "hugging" tactics that both the Chinese in Korea and the North Vietnamese used against the United States Army to negate the American firepower advantage.

## ENGAGING MULTIPLE TARGETS

Technology has also greatly affected the rate and weight of fire over the years. Magazine fed rifles, power assisted loading artillery, and aircraft that can deliver literally tons of munitions on target have tremendously increased the capability of soldiers to cover any area in range with a high volume of fire. Fewer forces are therefore needed to cover a given area or number of targets with fire. A basic example of this concept is the achievement of the same fire effect by replacing several riflemen with one machinegun. Rockets, missiles, bombs, artillery, and even mortar shells are designed with multiple warheads that, using imbedded sensors, each independently seek out and home in on a different target. Fire direction computing on board each fire support platform along with exact navigation instruments and digital communications reaching to the individual soldier level will allow each individual fire support system to attack discriminate, individual targets with precision munitions. Simply put, instead of six artillery pieces in one battery engaging one target, six different targets can be engaged. Combining the delivery of large quantities of munitions in a short time with precision engagement provides the capability to move the concept of "one shot, one kill" from attacking and destroying a single target to attacking and destroying an entire enemy formation.

## SITUATIONAL AWARENESS, FRATRICIDE, AND REACTION TIME

> Know your enemy and know yourself; in a hundred battles you will never be in peril.
> –Sun Tzu[28]

Where am I? Where are the units on my left and right? What is on the other side of the hill? Are there any friendlies to my front? Who is that walking toward me in the mist—the enemy? A lost civilian? The Platoon Leader? Lack of information on friendly locations has thwarted decision makers since armies began to break into separate units for maneuver. An American company commander in World War II tells in vivid detail his frustration when he could not get artillery fired on what he positively identified as a German troop concentration near the Siegfried Line because the artillery maps showed another U.S. unit at that location. The next morning, his unit took heavy casualties from the Germans at that same site and it turned out a neighboring unit had misreported its location[29]. In the 1991 Persian Gulf War, there was confusion over the unit locations in the American VII Corps to the extent that the location designated by the American Commander in Chief for the cease-fire talks was a place not even held by United States troops[30].

At the U.S. Army's Joint Readiness Training Center (JRTC), infantry units are required to fight a well-trained enemy in a low intensity conflict. Part of the enemy's arsenal is mortar crews who can quickly set up, fire a few rounds, and then disassemble the mortar and move from the area within minutes. "Firefinder" radar often spots the mortar, plots its location, and relays the information to friendly artillery in a matter of seconds. However, in most cases the counter-mortar mission is never fired or is without effect. The reason is that before the artillery fires, it must check with the unit responsible for the area to ensure no friendlies are present. That check is accomplished by voice, over different nets across units and up and down varied nodes and echelons of command. Often the answer is given by soldiers on foot

in the dark, trying to maintain noise and light discipline, or by harried "battle captains" in command posts, squinting through layers of grease pencil marked acetate on a map to get the right grid coordinates. By the time the check is complete, the enemy has skedaddled. Similarly, at JRTC, Attack Helicopters often do not engage enemy elements, as they cannot determine whether they are friendly, enemy, of civilian. Having a real time picture of friendly forces provides the means for rapid engagement of fleeting targets while avoiding both fratricide and the current system of time consuming checks.

New technology will give soldiers of the future a dramatically improved picture of friendly forces, down to the individual soldier level. Global positioning or other systems will show exact locations of friendly forces. New technologies will provide warning indicators when our own weapons acquire friendly forces. Digital communications will link soldiers and vehicles on the ground to each other and air, space, and sea platforms providing a real time, shared picture of the battlefield and the friendly forces on it. Soldiers will be able to react quicker, knowing that the target they've just acquired is not friendly. Incidents of fratricide will decrease and leaders with more complete information will make better decisions.

## CALL FOR FIRE

Since Gustavus Adolphus implemented the "regimental piece" in 1630, a type of light artillery that traveled with infantry regiments and fired at their command, armies have tried to push heavy firepower down to the level where it is most needed—to the soldiers actually in contact with the enemy.[31] Because of size and weight, artillery could often not traverse the same ground that infantry moved across. Because artillery was expensive and a relatively scarce resource compared to infantry, it was centralized and fired at the command of senior officers. Part of the problem was solved when artillery began indirect fire and infantry units incorporated man-portable mortars and grenade launchers. However, indirect fire artillery then became hostage to elaborate computational techniques that hindered timeliness. Replacing stubby pencils with computers has increased the accuracy and speed of those computations and thereby the responsiveness of fires, but obtaining fire support can still be a time consuming process.

Responsive, heavy, close-in fire support is now largely a function of communications to supporting artillery or air units. That communication has progressed from flags, cloth panels, smoke, and flares in its infancy to field telephones trailing wire in the wake of an attack to its current system of specially trained artillery forward observers (FOs) and Air Force Forward Air Controllers (FACs) with dedicated radios attached out to infantry units. In World War II, FOs were sent down to company level and would then move about to gain the appropriate target information. That system has been further decentralized in the current Army with FOs down to platoon level and FACs at battalion. Even then, there is often delay (and also confusion!) as the calls for fire are relayed by voice from a soldier to a squad leader, and then by radio to the platoon leader, who then instructs the FO, who then puts in a call through his artillery counterpart on a different radio net at company or battalion level, friendly positions are checked, the artillery makes computations, prepares ammunition, and adjusts the howitzers to fire the rounds. Obtaining Close Air Support requires even more links and checks and time.

As communications and computing technology advances, every infantry soldier who acquires a target will have the capability of calling for fire and having virtually instantaneous response from the most appropriate available firing unit with the required munitions, whether it be a precision guided bomb dropped from an aircraft 15 kilometers away, an artillery projectile from 40 kilometers, a rocket from 200 kilometers, a cruise missile launched from a UAV or submarine from 500 kilometers, or something not yet dreamed up. The trend is toward virtually eliminating the delays involved with different communications links, centralized controls, and organizing massed fires.

## COMBINED ARMS, MANEUVER AND TACTICS

The history of military organizations is one in which combined arms and the capability for maneuver has steadily progressed to lower and lower levels. Corresponding to that movement, units and soldiers have become ever more dispersed and battlefields have become increasingly non-linear. As a consequence, leaders at lower and lower levels have had to make the decisions inherent in having sub-divisible forces for maneuver. They have also had to develop the expertise to effectively employ an ever-widening variety of arms and weapons.

Ancient armies were most often unitary formations. They moved and fought as a single entity under the control of a single commander. The Greek phalanx is the most well known example. Soldiers in this organization were expected to fight hard and well, but there was no room for independent action or initiative. Philip of Macedonia and his son, Alexander the Great, introduced combined arms and maneuver with "hammer and anvil" tactics in which an infantry phalanx would hold or fix the enemy while a cavalry "hammer" would sweep around to strike in the flank or rear of the opposing army[32]. This included the concept of separate types of units that had to work in close cooperation on the battlefield, i.e. combined arms, thus increasing the degree of complexity for both the enemy and the Macedonian commander. The different arms of cavalry and infantry were "combined" at the level of the army commander, just as maneuver was directed at that same level.

The Romans took maneuver a stage further with the *manipular* legion. It broke the infantry phalanx up into sub-units that could maneuver. Legions of 3000 men were divided into three waves which were further subdivided into *maniples* of 120 soldiers and *centuries* of 60 men, each grouping under its own commander. Using these elements legion commanders could quickly exploit gaps and penetrations in the enemy's lines, maneuver to an enemy's flank, or reinforce a portion of its own battle line. Further, each legion included its own contingent of 600 cavalry for reconnaissance, protecting its flanks and rear, covering withdrawals, or to pursue a defeated enemy. Sub-unit leaders were now required to do more than simply lead their soldiers in fighting. They had to maintain situational awareness, be alert to exploit opportunities, cooperate with adjacent units, and act independently. Commanders of legions had to be adept at maneuvering both infantry and cavalry, as well as operating in conjunction with other legions on the field of battle[33].

It wasn't until after the fall of Rome and the end of the Dark Ages centuries later that the trend toward combining arms and maneuver capability at lower and lower levels picked up again. Gustavus

Adolphus of Sweden organized squadrons composed of 216 pike men and 192 musketeers. He also included field artillery pieces within the squadrons as well as separate field artillery batteries. Three or four squadrons made a brigade. Similarly, he organized cavalry squadrons and brigades, again with their own artillery. Brigade Commanders could further "task organize" their squadrons; for instance attach the musketeers from one squadron to another[34]. As muskets became more reliable and with the invention of the socket bayonet, the pike men disappeared, but the basic organizations of artillery batteries, cavalry squadrons, and infantry battalions remained roughly the same for the next two hundred years.

Armies progressed from moving and fighting as single units, such as the Greek phalanx, to armies that still moved as one body, but had the capability to maneuver sub-elements on the battlefield, such as the Romans and Gustavus Adolphus's army. Bourcet's ideas of "march divided, fight united" were exploited by Napoleon with his dispersed "net" of separate army corps advancing on a broad front[35]. The elder Von Moltke built on Napoleon, but instead of uniting his armies on the battlefield and then fighting; his armies were employed as separate maneuver elements. This increasing lateral dispersion reached its zenith in World War I when, in an initial series of maneuvers by both armies to outflank each other, they stretched their fronts from Switzerland to the sea.

New technology then interacted with ideas to produce new tactics. Radio and wire communication allowed orders and information to pass over extended distances instantaneously, thus allowing forces to operate at greater distance from their headquarters. Motorized transport allowed maneuver at unprecedented speeds and distances, especially in the open terrain of farmlands, plains, and deserts. Paratroopers added "vertical envelopment" to the types of maneuver. Forces could now spread out for protection and then assemble quickly to concentrate overwhelming combat power at a specific point, and, just as quickly, disperse again. Tanks provided mobility under fire with armored protection and tracks to enable off-road movement.

In World War II, the German *blitzkrieg* combined lateral dispersion with quick concentration on narrow fronts to achieve breakthroughs into the enemy's depth with combined air-ground forces. As a result, forces became dispersed in depth along actual or anticipated breakthroughs as well as in breadth along the line of contact. The scale of success of these tactics was primarily a function of the maneuver capability imparted by the armored mobility of tanks along with supporting aircraft[36].

At the same time, Mao Tse Tung was employing tactics of combined guerilla and conventional warfare in China that caused further dispersion. Guerillas operated throughout the Japanese rear, forcing numerous small detachments to be scattered guarding lines of communication and key installations. Chinese conventional type forces fought a war of movement in which retreats, flanking maneuvers, and advances were conducted over hundreds of miles by various forces on a battlefield that was both linear and non-linear at the same time[37].

More recently, the Vietnam War and 1973 Arab-Israeli War demonstrated two different approaches to warfare that represent the drive toward dispersion and non-linearity in different ways. The North Vietnamese "gnat swarm" tactics involved numerous small actions throughout South Vietnam every

day[38]. The result was a dispersion of opposing forces throughout the entire country. There were no lines or front or rear. Or, from another perspective, the front lines were anywhere forces were and both front and the rear were everywhere. The American reaction to these tactics was to use superior technology in the form of helicopters to maneuver rapidly against the enemy. A similar situation occurred with the Mujahadeen in Afghanistan in their war against the Soviets and their puppet government.

After initial reverses, the Israelis used fast moving, mobile armored units to attack where the enemy was not or was weak in order to get into his rear, thereby turning and dislocating enemy forces both in the Sinai and in the Golan Heights. By seeking gaps in enemy positions, Israelis increased dispersion between their forces and the enemy's. By striking deep, the Israelis increased dispersion within their own forces. Turning the enemy caused him to disperse his forces to meet the Israeli threat. The subsequent dispersion, unlike the Vietnam example, was uneven. There were several intermingled concentrations of both Arab and Israeli forces along with a few forces isolated and some areas where no forces existed from either side[39]. Similarly, in the Gulf War, the wide sweep around the open west flank of the Iraqi Army by the American XVIII and VII Corps brought about the same type results as the Arab-Israeli War.

These tactics and resultant dispersion on the grand scale were mirrored at the small unit level. In the Civil War, maneuver was accomplished at regimental and battalion level. By World War II, platoons and squads were conducting fire and movement and flanking maneuvers on the battlefield. Current Army infantry units maneuver all the way down to the fire team (four soldiers) and "buddy team" level with foot soldiers or to the level of one fighting vehicle acting in conjunction with a "dismount" element of three to six soldiers. Maneuver normally includes one element fixing the enemy with an attack or by fire while another element moves to attack the flank or rear of the enemy force. With the future capability of every soldier calling in precise, remote based fires, the potential exists for future soldiers to conduct fire and maneuver on their own.

Combined arms has followed the same route. A Civil War infantry regiment featured every soldier armed in exactly the same way. In World Wars I and II, infantry units began to incorporate machine guns, bazookas, and automatic rifles down into the platoons and even squads. Modern Infantry companies include their own mortars for indirect fire. Platoons include anti-armor missiles and an FO for access to artillery. Each fire team has rifles, a machine gun, a grenade launcher, hand grenades, and depending on the circumstances, mines and light anti-armor weapons. Mechanized or motorized infantry adds transportation, armor protection, and firepower in the form of automatic cannons, machine guns, and heavy anti-armor missiles to the infantry squad and platoon. Combined arms has gone from the army level down to the control of junior infantry noncommissioned officers.

The U.S. Army's plan for the "Objective Infantry Combat Weapon" (OICW) and "Land Warrior" system simply takes this combined arms devolution to the last logical step. The OICW includes a combination rifle, machinegun, and grenade launcher along with attached laser and night sight for day and night precision engagement. The Land Warrior computer and communications components provide

the promise of every soldier having instantaneous access to ground and air fire support systems.[40] Combined arms will soon take place at the individual infantryman level.

## RECEIVING FIRE

The "flip side" of increased lethality is the effect it has on the soldiers on the receiving end of the fire. Groups of soldiers simply provide a more conspicuous target on which these deadly fires could be focused. For example, in 1896 a group of Boer riflemen equipped with rapid firing long-range rifles killed or wounded over half of the battalion of British soldiers who attacked them in close-order formation[41]. Armies have learned to reduce their vulnerability by dispersing their soldiers both laterally and in depth.

## DIGGING, DISGUISING, DISPERSING

Any soldiers who were clearly visible became targets. As a result, soldiers began to hide. They lay down on the ground. They dug holes. They camouflaged themselves and their equipment. They dispersed so as not to be identified as an attractive target. They dispersed so as not to be hit by the effects of fires aimed at another soldier or piece of equipment. The U.S. Army today teaches its soldiers to crawl under fire or to "rush" in 3-5 second sprints from one covered position to another. Lethality of fire resulted in survivability to become equated with dispersion and invisibility.[42] The ability of the Yugoslavian Army to disperse and hide their troops and equipment in Kosovo from NATO air attack caused NATO military planners to give up on targeting the Yugoslavian military in the field and shift air attacks to primarily civilian targets in order to persuade President Milosevic to agree to NATO demands.

Improvements in technology contributed further to the empty battlefield by enabling soldiers to reduce their vulnerability while fighting. Technological advances were made in such areas as smokeless powder and magazine fed rifles. Without the characteristic puff of smoke from black powder, riflemen could now fire relatively anonymously. With magazine-fed rifles, soldiers were no longer vulnerable during a lengthy reload process. They could also reload and fire while lying down, further reducing their vulnerability. Indirect fire artillery was the next innovation. Soldiers could now deliver fire from completely out of sight and sound of the enemy.[43] The ultimate in survivability while delivering fire on the enemy is, as discussed earlier, for a well- hidden soldier to anonymously engage the enemy with fires based a continent away.

## THINNING OUT THE BATTLEFIELD

The bottom line of these increases in weapons ranges, accuracy, volume of fire, and lethality of effect is that armies achieve the same firepower effect in a given area with far fewer soldiers. By way of illustration, at Waterloo the Duke of Wellington had 72,000 soldiers defending a six-kilometer front. [44] In 1980, the doctrinal defensive frontage for a United States Army infantry battalion was the same six kilometers.[45] Military historian Trevor N. DuPuy further quantified this trend toward increasing dispersion with the following figures[46]:

Battlefield Dispersion

| Period | Density (Meter$^2$ per Man) |
|---|---|
| Antiquity | 10 |
| American Civil War | 257 |
| World War I | 2,457 |
| World War II | 27,500 |
| October War of 1973 | 40,000 |
| 2025 | ? |

All the forces that created the empty battlefield are continuing. The technological trends are to create weapons with even more range, accuracy, and lethality. Combined arms and maneuver capability, with the corresponding requirements for increased knowledge and decision making, are pushing down to the small units and even to the individual soldier level. The dual factors of needing even fewer soldiers to generate even more firepower and the danger of concentrating within the reach of the enemy's firepower will continue to drive forces toward increased dispersion. Communications, vertical envelopment, and ground mobility will enable troops to operate in relative isolation; deep behind the enemy or intermixed with the enemy's forces. In 1969, General William Westmoreland made the following statement:

> I see battlefields on which we can destroy anything we locate thorough instant communications and almost instantaneous application of highly lethal firepower, with first round kill probabilities approaching certainty, the need for large forces to fix the opposition physically will be less important.[47]

While he was premature with his statement in 1969, his description is right on target as it applies to the battlefield of the future.

## SUMMARY

The battlefield of the future will be a chaotic and non-linear environment. Forces will be intermingled and highly effective weapons will inflict great destruction and force wide dispersion. United States Army combat forces will be equipped with technology enabling unprecedented tempo, speed, and lethality within this environment. The battlefield of the future will include the same components as the past: danger, physical exertion, uncertainty, fog and friction. The impact of these components on the individual fighting soldier is increased and sharpened by the ongoing trend of the "empty battlefield" and resultant dispersion. It will also place ever more increasing importance on the technical capability of the infantry soldiers who must effectively employ ever more advanced weapons and equipment. The qualities and attributes of the individual soldier himself are also more important than ever when each soldier has the capability to call on and direct firepower that until recently either did not exist or was only available to large unit commanders. Just as the characteristics of the future battlefield are different more in scale and complexity than in essence from past battlefields, the same for the characteristics of successful infantry soldiers on this battlefield.

## INFANTRY OF THE FUTURE

The companies and battalions will be more dispersed, and the men will be less under the immediate eye of their officers, and therefore a high order of intelligence and courage on the part of the individual soldier will be an element of strength.

--General William Tecumseh Sherman[48]

## INFANTRY REQUIREMENTS ON THE FUTURE BATTLEFIELD

Certain requirements for infantry are derived from the characteristics of the future battlefield. They must be listed before the infantryman himself is described:

Danger--Physical and moral courage. For infantry, the aggressiveness needed to place himself at great risk in order to close with and destroy the enemy, and to do so on a sustained basis and on a battlefield where the danger can come from any range or direction at any time.

Uncertainty—Adaptability and tolerance for ambiguity. The infantryman must act decisively in an environment where change is constant and he will never, ever have all the information he needs; where he is intermixed with civilians and both friendly and enemy soldiers.

Friction—Character and perseverance. The infantry soldier must have the ability to press on in spite of obstacles, equipment failures, and the mistakes and letdowns inherent to the realm of human endeavor. He must be able to act independently and make good decisions with little or no supervision.

Physical Exertion—Endurance and strength. Infantry soldiers must be toughened to endure long periods of physical activity and high stress with little rest. They must be able to carry a heavy combat load and still be agile and mobile. They must have the strength to lift and carry heavy loads and operate in urban environments.

Sophisticated Equipment—Technical Expertise. The infantryman must effectively use advanced weapons, communications, and sensors. He must be a combined arms soldier, capable of using a wide variety of weapons or directing the use of supporting arms. He must be a master of his craft.

## FUTURE INFANTRY CHARACTERISTICS

Clearly, the days are long gone when an infantryman simply needed to perform weapons manual by rote memory and then execute some close order drill to be successful. The role of the modern infantry soldier is already the most complex in the Army. The future simply accelerates the complexity. The previously listed requirements for an infantryman to successfully function on the future battlefield give rise to several necessary human characteristics.

*Physical and moral courage.* Who will fight on a battlefield? While it currently remains impossible to predict exactly what a specific individual will do in battle, there is data that indicates characteristics of fighters. Two characteristics stand out, intelligence and gender.

In a World War II study of combat infantrymen, soldiers in several rifle companies were evaluated on combat performance and then classified as below average, average, or above average. Of the men with test scores (correlating to general intelligence) placing them in the highest three of the five test

categories, 58% were rated above average in combat performance and only 6% below average. A similar correlation existed with education level.[49] (Another interesting finding in the same study was that "Courage and Aggressiveness" was the number one characteristic named by veteran infantrymen when they were asked to describe one of the best combat soldiers they had known.[50] It ranked ahead of both leadership and technical proficiency. The study does not cover whether high test scores and intelligence are linked to courage and aggressiveness, but by inference there appears to be a connection.)

During the Korean War, the Army contracted the Human Resources Research Office (HumRRo) to make an analysis of infantry soldier combat effectiveness. The purpose was to identify the characteristics that differentiate the "fighter" from the "non-fighter". Researchers had front line infantry platoon members rate the combat behavior of their peers. Based on the ratings of over 2000 soldiers, 310 combat infantrymen were identified as fighters or non-fighters. A battery of tests was conducted consisting of everything from measures of personality and intelligence to life history inventories and aptitude tests. In this multitude of test, the single factor that most characterized the difference between fighters and non-fighters was intelligence. Fighters scored an average of 94 on the military's general intelligence test versus an average of 83 for non-fighters. Of less magnitude, still with significance, the amount of education was positively related to fighting performance. The average fighter had approximately one half year more formal education than the average non-fighter[51].

More recently, in Combat Effectiveness Interviews conducted with Desert Storm veterans and in a Desert Storm research study entitled Prediction of Combat Performance, again a high correlation was found between combat performance and intelligence (cognitive ability, as it is described).[52]

Finally, in World War II, German infantry consistently outfought their American counterparts. Military historian Trevor Dupuy found that, win or lose, on the attack or on the defense, German troops inflicted about 50% more casualties on Americans than were inflicted on Germans by Americans. Martin Van Creveld's study of this same phenomenon concluded that the difference was attributable to a German system that sent the best soldiers to the front versus an American system that did exactly the opposite. The following table shows the World War II distribution of American soldiers by general intelligence; category I being highest and V lowest.

DISTRIBUTION OF AMERICAN MANPOWER[53]

| | I&II | III | IV&V |
|---|---|---|---|
| Army Air Forces | 44.4% | 35.3% | 20.3% |
| Army Service Forces | 36.5% | 28.5% | 35.0% |
| Army Ground Forces | 29.7% | 29.0% | 37.0% |
| --Infantry-- | 27.4% | 29.0% | 43.6% |

The Army Ground forces, which consisted of combat unit soldiers, were loaded up with lesser quality soldiers. The composition of infantry units with the Ground Forces was even more dismal. The implications are obvious. More intelligent and better-educated individuals make better infantrymen.

Throughout history males have served in the military role as the warrior or combat soldier, the individual who places himself at risk to close with the enemy in order to kill or capture him. As this

peculiarly male role is consistent through the ages, in every inhabited continent, and across all cultures and races, it is difficult to ascribe it to a male plot or as simply a cultural aberration. There are ancient descriptions of Amazons, but the same books also describe the Minotaur, sea nymphs, and other mythological creatures. Television debates on women in combat often reference the Israeli Army as an example of incorporating female combat soldiers, but that was a short lived and failed experiment that did not outlast the 1948 war for independence. Much is made of war leaders such as Boedica leading the ancient Britons against Rome, Joan of Arc, Golda Meir, and Margaret Thatcher. However, there is a significant difference between ordering soldiers into combat or even being present on the field of battle versus being the soldier actually closing with and fighting the enemy. Females have often defended themselves, but there is also a significant difference between the pioneer woman firing a weapon to help defend her home and the warriors who have left their home to attack her; just as there is a difference between a clerk with a rifle defending the division headquarters and the infantry soldiers attacking to kill or capture the people in it.

Literally scores of studies on aggression also note the much larger propensity for males to engage in physical aggression as compared to females.[54] While many of the studies vary on how much genetic differences between the genders cause this behavior versus the impact of social roles, virtually all agree that genetic or biological determinants have a role to play. Many say they play the primary role. In other words, males are programmed for a higher level of aggressive behavior from before birth. These findings are based on the facts that males are more aggressive in all human societies, that the differences in aggressive behaviors by gender are found early in life, and that similar differences are found in the primates most closely related to humans as well as in the vast majority of animal species[55].

The dispersed, chaotic and dangerous battlefield of the future demands fighters. To get them, the infantry must continue to be selected from the males of the species and from the higher intelligence categories and education levels within that gender.

*Character and Perseverance.* Lord Moran, in his influential book "Anatomy of Courage" contends that character is the supreme determinant in war. That "a man cannot be selfish in peace and yet be unselfish in war", that the daily choice of right from wrong is a habit developed in peace and not suddenly produced upon entry into combat. The stress of combat does not bring forth new qualities, it simply exposes and exaggerates that which is already there.[56]

Character in soldiers is found first in the recruiting process. The Army tries to recruit as low a percentage of non-high school graduates as possible. Those who do not complete the first significant challenge in their life are also more likely not to complete their enlistment tour. The first-term attrition rate for non-high school diploma holders is 41 % and is almost identical at 39% for non-graduates with a General Education Development (GED) certificate. Comparatively, attrition is 23% for high school diploma graduates. Further, non high school diploma graduates commit more incidents of indiscipline and misconduct than do enlistees with diplomas.[57] Prospective soldiers with criminal records are not permitted to enlist. Those with minor wrongdoings on their record may apply for a waiver of the

standards. (The D*irty Dozen* was entertainment, not reality. The same people who commit crimes as civilians commit crimes and shirk their duty as soldiers.) It is then in the pressure of initial entry training, whether it be basic training, West Point's Beast Barracks, or Officer Candidate School, that soldiers are placed in a stress filled environment with exacting standards. Those with character find their habit of choosing the harder right over the easier wrong reinforced. Those who have difficulty functioning in that environment either learn new habits or are separated. Ranger School and Special Forces Assessment and Qualification courses are simply the same concept applied to a higher degree. The key is a crucible that stresses and ultimately strengthens character. A more intense experience equals development of a more staunch and resilient character or the identification of more deeply hidden character flaws.

Character is critical to perseverance. Clausewitz uses perseverance much as Lord Moran describes character: ". . . there is hardly a worthwhile enterprise in war whose execution does not call for infinite effort, trouble, and privation; and as man under pressure tends to give in to physical and intellectual weakness, only great strength of will can lead to the objective." [58]

The future battlefield will require infantry with great strength of will to persevere. Rigorous and ongoing screening of recruits and soldiers is necessary to ensure only soldiers with the strongest character are selected. Initial entry training must be tough and demanding enough to stress soldiers so that positive character can be strengthened and those with weak character further developed or weeded out. Significant attrition must be accepted as part of the training process.

*Tolerance for Ambiguity and Uncertainty.* The ability to act with available information, to move decisively without all information is critical in the fog of war. Training regimens can create such situations and further develop these capabilities, but some soldiers will still fail. United States Army Special Forces soldiers are expected routinely to operate in environments of ambiguity and uncertainty. To achieve soldiers with those qualities (as well as other desirable attributes) the Special Forces runs a lengthy and expensive qualification course. To ensure soldiers with the best chance of succeeding in that course are selected, each soldier must first go through a program called Special Forces Assessment and Selection (SFAS). Uncertainty and ambiguity are themes in this course. Foot marches are of indeterminate length. Missions change rapidly and are assigned and terminated without notice. Promised equipment does not appear or is broken. Briefed situations are complex and do not match what actually occurs and so on.

SFAS also includes personal assessments and a battery of tests that measure intelligence and education along with personality and behavioral tendencies. The results show strong correlation with completing both SFAS and the follow-on Special Forces Qualification Course (SFQC). Emotional maturity and behavioral reliability, both critical components of operating in ambiguous and uncertain situations, are assessed using specially developed tests from the Army Research Institute (ARI) and a widely used civilian instrument called the Minnesota Multiphasic Personality Inventory (MMPI). The results of the tests are strongly predictive of success or failure in SFAS. For example, on one ARI measure called the "Delinquency Score", candidates with a high score are twice as likely to drop out versus those with a low score; with 80% of those with a high score failing to complete SFAS.

Psychological measures, including the MMPI and ARI identify Special Forces candidates who are categorized "High risk-psychological". At the beginning of SFAS, this group includes about 21 % of the total candidates. At the end of SFAS it is down to approximately 15% . At graduation from SFQC, less than 5% of the graduates are from the high risk-psychological grouping; meaning almost four-fifths of this group do not make it through the training. Voluntary withdrawal and review by the graduation board are the reasons for the higher attrition.[59]

A further indicator of success in coping with the Special Forces assessment and qualification, similar as discussed for character, is education level. Even with the SFAS prerequisite of several years of successful service in the Army and the achievement of rank as at least a junior noncommissioned officer, those individuals (about 4%) who enter with a GED as their highest educational accomplishment succeed at less than half the rate of all other candidates.[60] The ability to handle uncertainty and ambiguity is related to character and the will to persevere. Education to at least the level of a traditional high school diploma correlates well with both. When combined with the psychological testing, it is a good predictor to determine who can handle the uncertainty and ambiguity inherent to the battlefield.

*Physical Endurance and Strength.* An infantry soldier must be physically strong enough to carry a full combat load, agile enough to move under fire and in the rubbled terrain of an urban environment, powerful enough to lift wounded comrades or other heavy burdens; as well as toughened to withstand the rigors of physical exertion and little sleep for extended periods of time. In the World War II "American Soldier" study there was a correlation between physical fitness and the confidence of veteran infantrymen in their readiness for further combat. Approximately twice as many soldiers who were classified in very good, good, or fair condition self-reported that they were ready for more combat than the soldiers who were classified as in poor or very poor condition.[61] While some of the self reporting may be based on an objective and rational assessment of personal fitness, it is just as likely that physically fit individuals are simply more self-confident, mentally tough, and motivated. Either way, fit soldiers are better able to cope with the debilitating stresses of combat and they perform at a higher level".[62] In the Desert Storm Combat Effectiveness interviews, in a primarily mounted environment, both strength and endurance were cited as factors in contributing to effectiveness.[63]

Soldiers are currently assigned to jobs within the Army without physical testing; other than a medical examination designed to determine overall health. Further, other than a test of general fitness administered semi-annually to all soldiers in the Army, the Army imposes no special physical requirements on its infantry. The most physically demanding branch of service remarkably has the same official physical requirements as finance clerks and cooks. The Army would fire a contractor who proposed to put an intricate, expensive gun turret and fire control system on an under-sized, under-powered chassis that could not carry the turret up a hill or over a ditch, ran out of gas after a few miles, and had to slow down to get up a hill. That is exactly what the Army does when it assigns physically weak soldiers to the infantry. The ability to move long distances in a certain time under a combat load,

demonstrate a measure of quickness and agility while also wearing the combat load, and lift a weight equivalent to a fellow soldier are reasonable minimal expectations for an infantry soldier.

The uncertainty of the battlefield also means uncertainty for physical effort. Minimum requirements, as described before, can be determined, but nobody can predict when combat will require a maximum physical effort, over and above Army standards. While the Army can expect to develop strength and endurance in new entrants, the best general method to get the most physically capable soldiers into the infantry is to continue to put only males in the infantry. In general, females have been found to lift only half the weight that males can lift.[64] Females in training units suffer load bearing type injuries such as stress fractures and shin splints at a higher rate than males. Males as a group are significantly faster, stronger, and have more physical endurance than females as a group; as observers of any playground, track meet, weightlifting competition, or integrated basic training unit can see.

The physical exertion requirements of the future battlefield can be best met by infantrymen who are physically trained for that battlefield and not simply to meet a general Army standard. The Army must support that goal with the imposition of branch specific physical standards and the imposition of institutional sanctions for those who do not meet them. Infantrymen who cannot meet battle-focused standards are a weak link who not only are dangerous to themselves and others, but also cause a risk to mission accomplishment.

*Technical Proficiency.* Higher levels of intelligence also positively correlate with technical proficiency. The Army tested a group of trainees attempting to correctly put a Stinger (man-portable anti-aircraft missile) into operation. Most of the soldiers with high and mid level AFQT scores (Armed Forces Qualification Test—a measure of general intelligence), quickly mastered the task with over 90% getting it right within three tries. However, the low AFQT soldiers took much longer. Approximately one-fourth of them could not get it right after 15 tries.[65]

In a later study, when AFQT scores were compared to hands-on performance for 30 different occupational specialties, the findings were that first, AFQT scores corresponded directly with hands-on performance; i.e. a low AFQT resulted in lower skill performance and a high AFQT in higher performance. Second, the higher AFQT soldiers maintained a higher level of hands-on performance proficiency than the low AFQT soldiers even after three-plus years of experience. Finally, the hands-on scores of high performing AFQT soldiers are higher in their initial test (i.e. with no experience) than the hands-on scores of low performing AFQT soldiers with three-plus years of experience.[66] Obviously, higher AFQT scores indicate a greater technical capability and a low AFQT score indicates limited capability and also limited potential for improvement. The unprecedented amount and diversity of equipment required of a future infantryman demands a high degree of technical capability. Critical to achieving that capability is for infantry soldiers to be selected from among the higher test score achievers.

## SUMMARY

Clearly test scores indicating intelligence are the biggest predictors of success for an infantryman on the battlefield of the future where danger and technical complexity are the two most salient

characteristics. Smarter people make superior combat soldiers. They are more technically proficient and they fight harder and better.

Close behind is education. The higher the education the better, but in particular attaining a traditional high school diploma or not achieving one correlates closely with a number of characteristics. High school diploma graduates appear more among those identified as fighters in combat. Non-diploma holders appear more among those identified as non-fighters. High School diploma graduates demonstrate a higher degree of character and perseverance. They complete the demands of initial entry training and even the much greater demands of more advanced and stressful training programs such as for Special Forces at rates two to four times higher than that of non-graduates. Similarly, they demonstrate a higher level of self-discipline, committing fewer incidents of misconduct than non-graduates.

Misconduct or criminal behavior as a civilian along with psychological testing such as done in the current Special Forces program is already highly predictive of the behavioral reliability so important to identify the critical characteristics of character, perseverance and taking the correct action in uncertain conditions. A highly stressful training period further makes evident desirable and undesirable personal traits.

Characteristics predominantly found in males are also essential for successful infantry. Males are the more physically aggressive gender; a critical characteristic in the branch called upon to close with and kill or capture an enemy trying to do the same to you. Males are also significantly more robust; they are stronger, faster, more agile, and can carry heavy loads further and with fewer injuries than females of the species.

## CONCLUSION AND RECOMMENDATIONS

You may fly over a land forever; you may bomb it, atomize it, pulverize it, and wipe it clean of life—but if you desire to defend it, protect it, and keep it for civilization, you must do this on the ground, the way the Roman legions did, by putting your young men into the mud.[67]

Not every branch of the Army is the same. Superb medical care, smooth administration, absolute air and naval supremacy, and the best logistics in the world can all exist in an Army that loses on the battlefield. If the infantry cannot fight well and win, the Army will not win, regardless of how well it does everything else. To win today, and much more so in the future, means the infantry must be composed of high quality soldiers. Spending millions to train and equip soldiers who will not complete their tour of duty, will not fight well or at all in combat, cannot maintain their equipment or use it to its potential, who physically or psychologically break down in training or on the battlefield makes no sense. Likewise the "cynical view that anyone can be made into an infantryman because he can stop a bullet as well as the next".[68] The task of the infantry soldier is to close with and destroy the enemy. He must accomplish this mission at the risk of his life in a lonely, high stress, rapidly changing environment filled with sudden

violence and difficult decisions. It is the most difficult mission in the Army and it is getting tougher all the time.

Recruiting and retaining the high quality soldiers needed for the infantry will require changes in the Army personnel business. First, infantry soldiers must have distinct standards for accession. Specifically, they must be young men with a traditional high school diploma and an above average score on intelligence tests. They can have no criminal background and must receive a score predicting a high level of behavioral responsibility on an instrument such as is given to Special Forces candidates prior to SFAS. They must have no health or medical problems that would limit the attainment of a high level of physical fitness. Second, initial entry training for infantry soldiers must include a high stress assessment phase near the beginning similar, again, to the Special Forces system. Recognizing that not everyone will have the qualities necessary for an infantryman, attrition will occur and must be acceptable. After the assessment, soldiers will not graduate from initial entry training until they have been trained on and demonstrated performance to standard on all infantry individual tasks. Again, although common sense must apply in terms of retraining and providing extra instruction, attrition must be acceptable in the cases of soldiers who cannot meet standards. Third, a separate physical fitness test for infantry soldiers must be established that is battle focused; i.e. oriented on infantry combat performance requirements. Fourth, retention in the infantry must be based on maintaining proficiency in infantry combat skills, to include weapons and other equipment and physical fitness. Finally, those who cannot meet infantry initial entry requirements or who go into the Army in a different branch should be given the opportunity to try out for the infantry after an initial period of successful service in another branch. They would still be required to go through the entire infantry assessment and initial entry training to ensure they have all the necessary capabilities.

To attract and retain the type of soldiers needed in the infantry, the Army must take several steps. While many quality young men will volunteer for the infantry based on the challenge and adventure (Of note, at West Point for at least the last three years, more cadets have selected infantry as their first choice than any other branch and it was most popular among cadet captains, those ranked the highest in military skills), even more will sign up if the branch is "glamorized" and advertised separately from other Army branches as an elite force. A limited list of potential further steps adding to the prestige and attraction of the infantry include enlistment and reenlistment bonuses, proficiency pay for maintaining infantry skill standards with a graduated scale for increased pay for exceeding standards, enhanced education benefits such as a year of full tuition for every year served, accelerated promotion into the NCO ranks (with unit tables of organization revised to reflect a much higher density of NCO slots), implementation of the warrant officer rank at the squad or platoon level, distinctive uniform items (the already authorized blue cord is only for the rarely worn Class A uniform), and protection from routine details such as post support taskings. Having a reputation for being selective and elite brings in many of those seeking a challenge—witness the success of the Marine Corps' "We're Looking for a Few Good Men" advertising program. Special pays have a certain cost-benefit appeal, but the real attraction is to

send the signal that the infantry is different and special. The point is to have the flexibility to put together the right package to attract and keep high quality infantry soldiers. The military already offers incentive pay (call it whatever you will) to pilots, flight crewmembers, and even naval surface warfare officers who all are at less risk than an infantryman and are less capable of achieving decisive victory.

For the United States of America to achieve decisive victory in a conflict, it must put infantrymen on the ground. It is a strategic imperative that American infantry be good enough to win. Only by changing the way the Army values, recruits, trains, and retains infantrymen will that imperative be met.

WORD COUNT = 13,397

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